

Foodborne Outbreak Detection and Surveillance

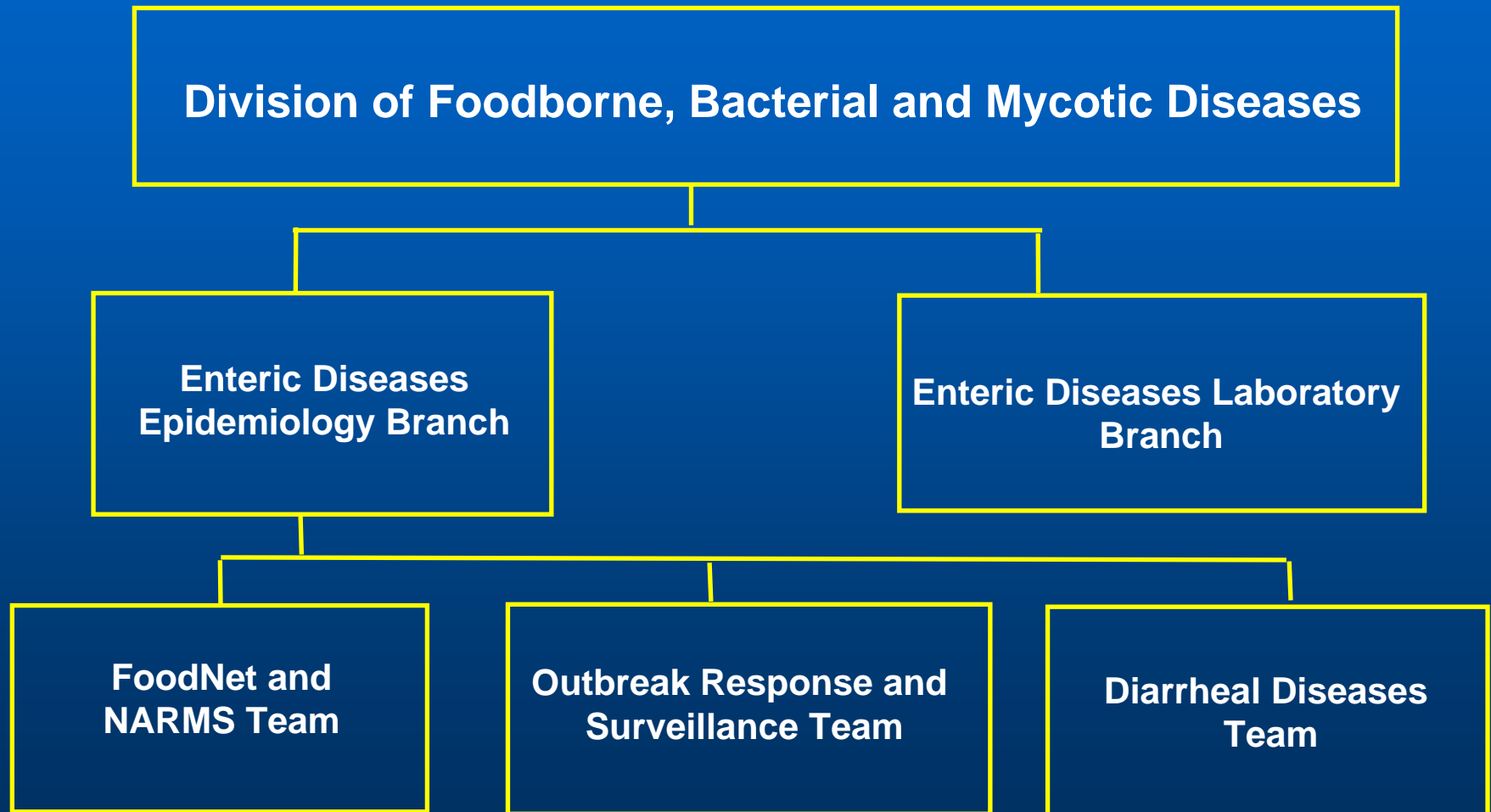
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National Center for Zoonotic, Vector-Borne and Enteric Diseases**



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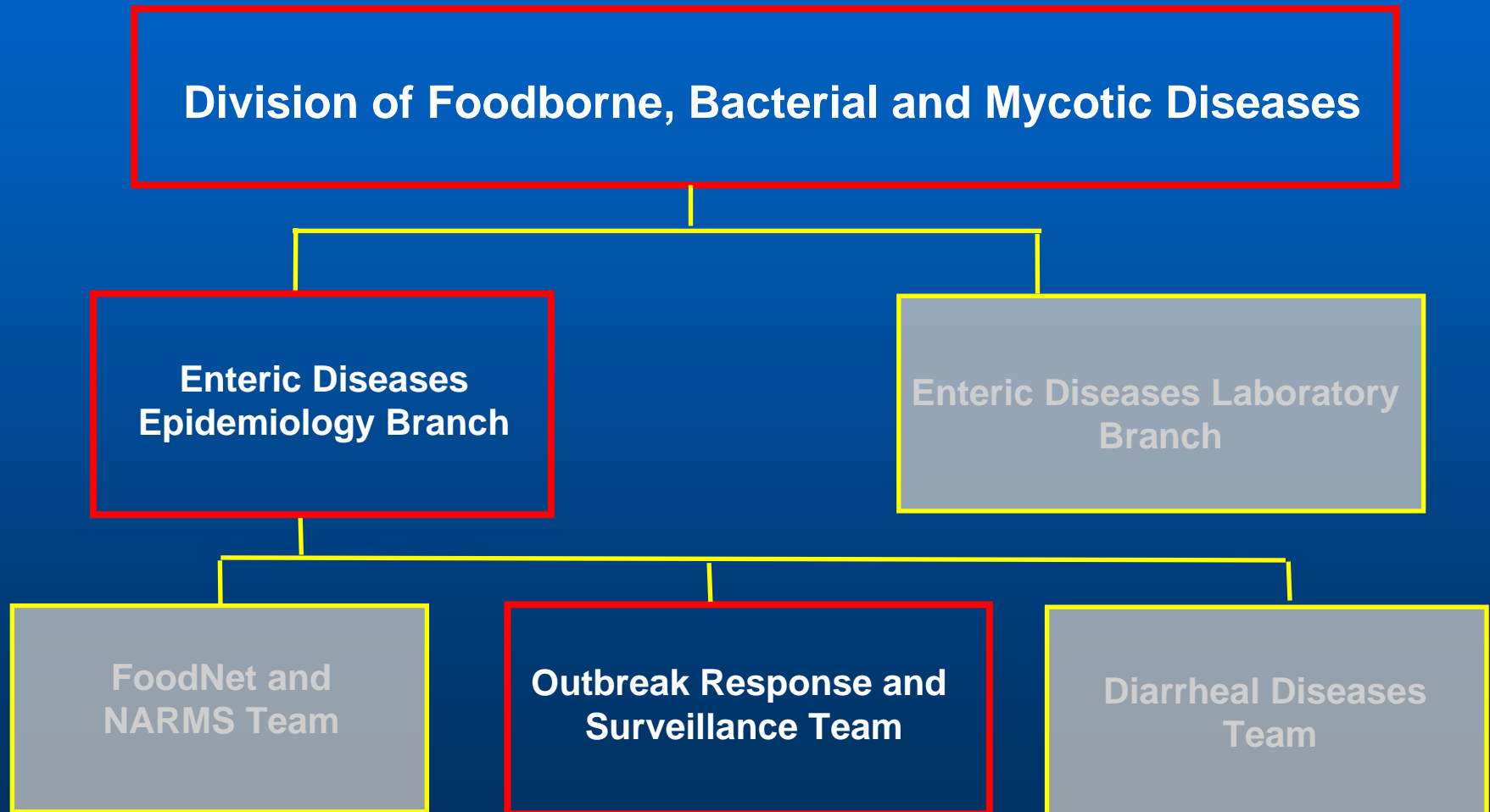
Division of Foodborne, Bacterial and Mycotic Diseases



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Role of the Outbreak Response and Surveillance Team

To investigate outbreaks of foodborne bacterial infections and establish both short-term interventions and long-term control measures to prevent similar outbreaks in the future.



What We Do

- **Outbreak response**
 - Consult on ~200 outbreaks per year
 - Field investigations, ~6 per year
- **National surveillance for foodborne bacterial infections**
 - Outbreaks (eFORS)
 - Case-based (botulism, vibriosis, listeriosis)
- **Special epidemiologic studies**
 - Determine risk factors for illness
 - Determine the burden of foodborne illness
 - Collaborate on studies around the world
- **Provide training and education**
- **Encourage new prevention strategies**
 - Collaborate with food safety agencies and others
 - Develop food safety guidance and support legislation

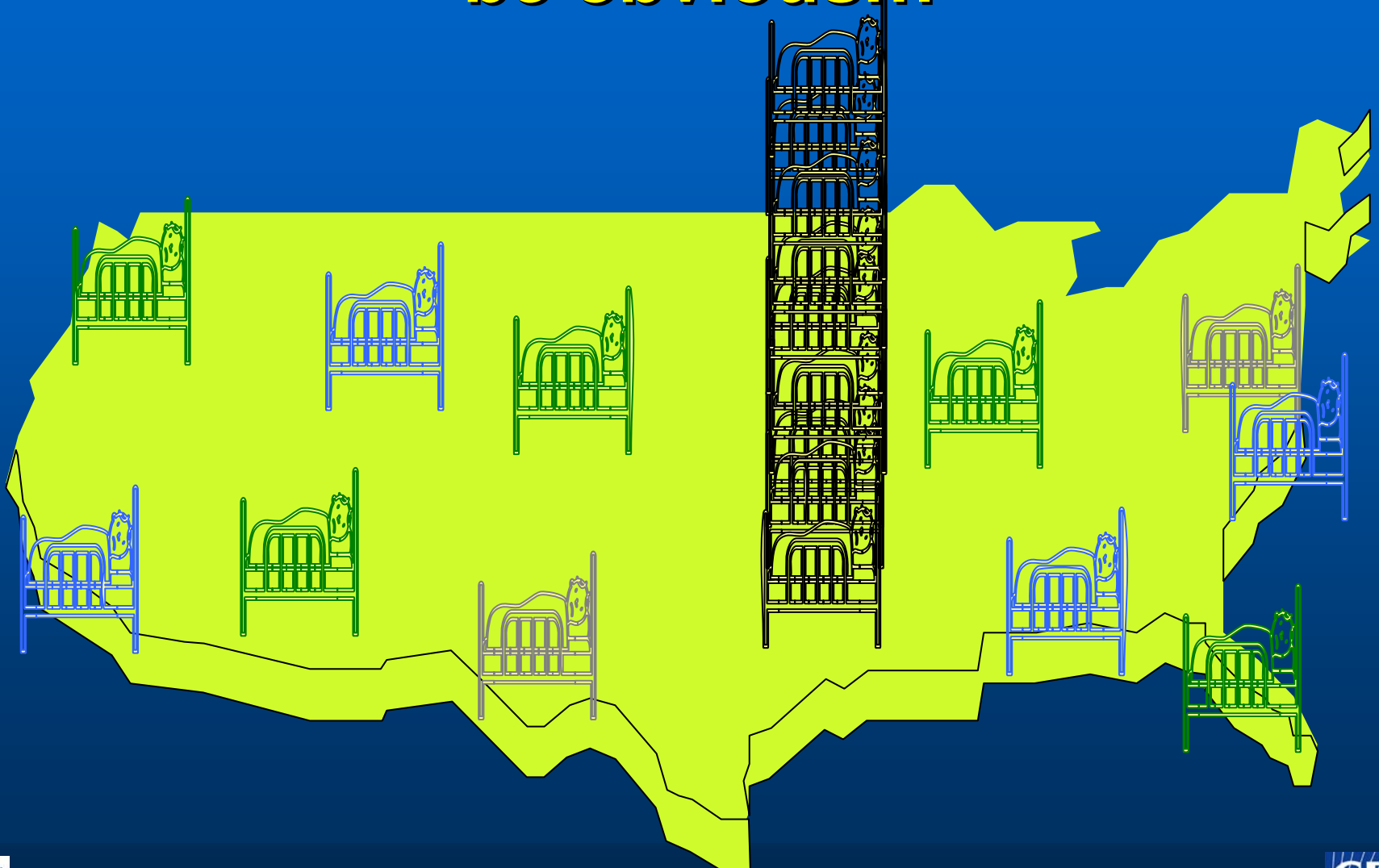


Surveillance Networks

- **OutbreakNet**
 - Network of public health professionals who investigate foodborne disease outbreaks
 - Includes state, local, and federal agencies
- **PulseNet**
 - Network of public health laboratories
 - Uses standardized protocols for subtyping (“DNA fingerprinting”) of enteric pathogens by pulsed-field gel electrophoresis (PFGE)
 - Share results with other state laboratories and epidemiologists through CDC PulseNet database



**A large outbreak in one place may
be obvious...**



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Identifying the vehicle...

- **Shotgun questionnaire**

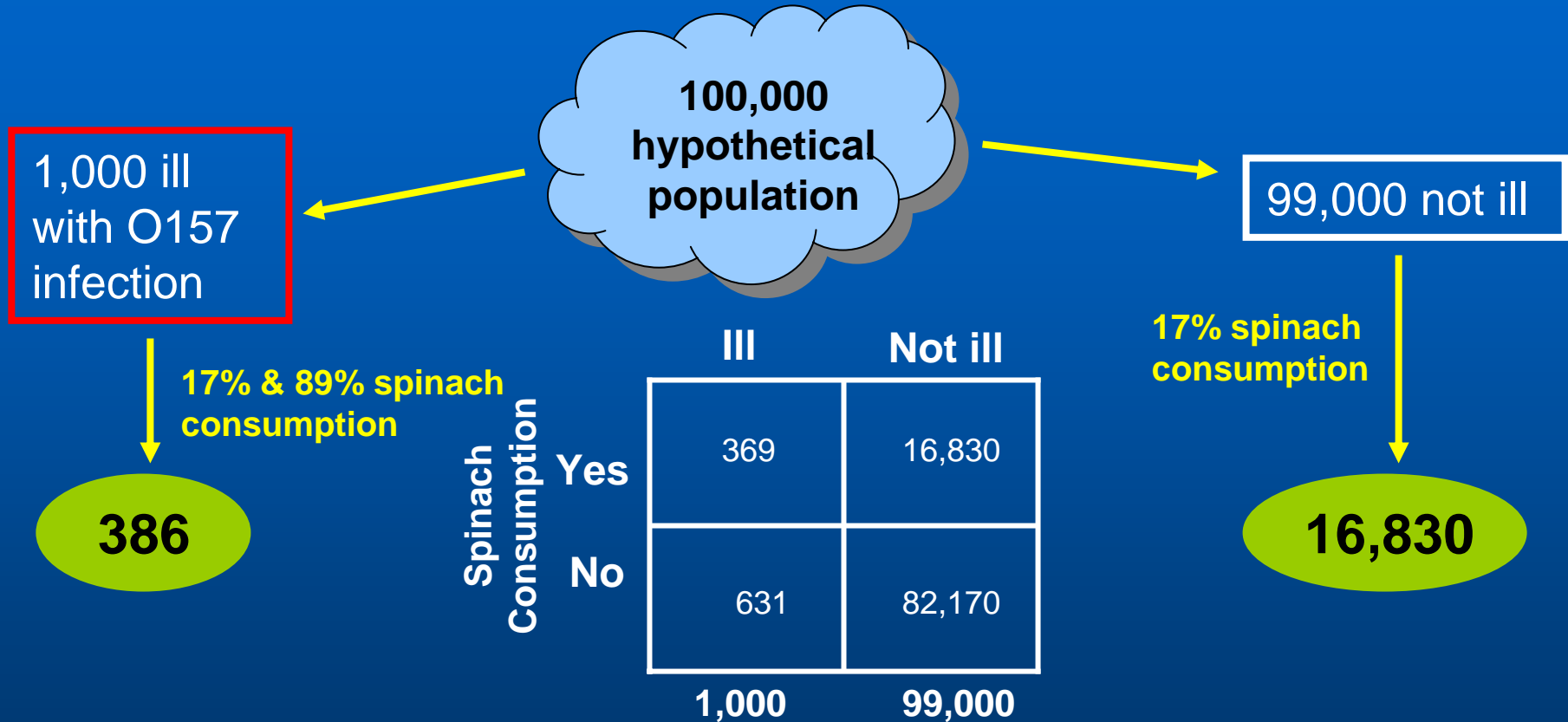
- Hypothesis generation
- Wide range of food exposures
- Food exposure frequencies among outbreak cases compared to what is expected in general population

- **Standard targeted questionnaire**

- Hypothesis testing
- Specific, targeted questions based on results of shotgun questionnaire
- Exposure frequencies among outbreak cases compared to exposure frequencies among well persons



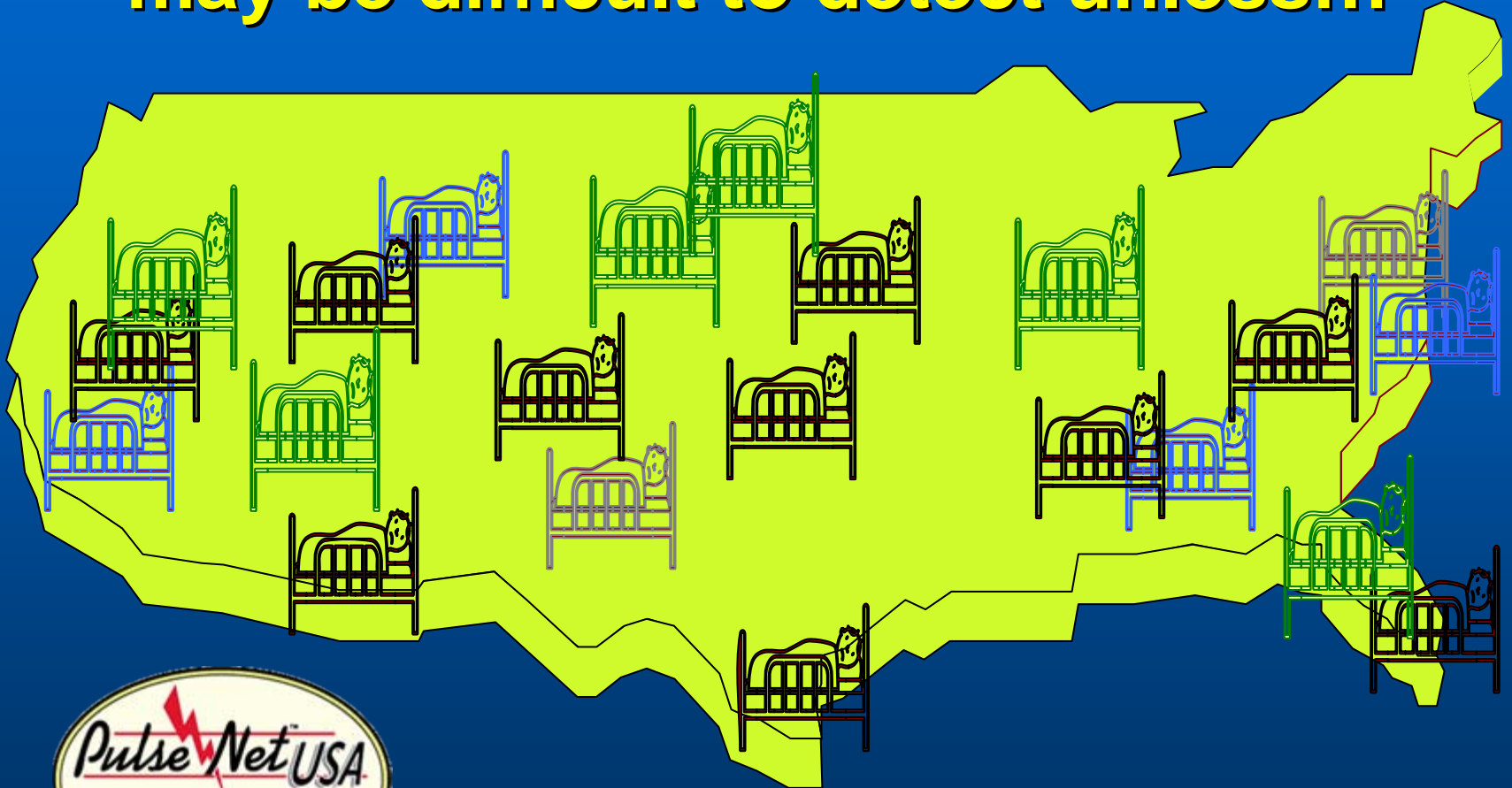
2x2 Exposure Table



$$OR = \frac{a*d}{b*c} = \frac{386*82170}{16830*631} = 2.99$$



A dispersed outbreak in many places may be difficult to detect unless...



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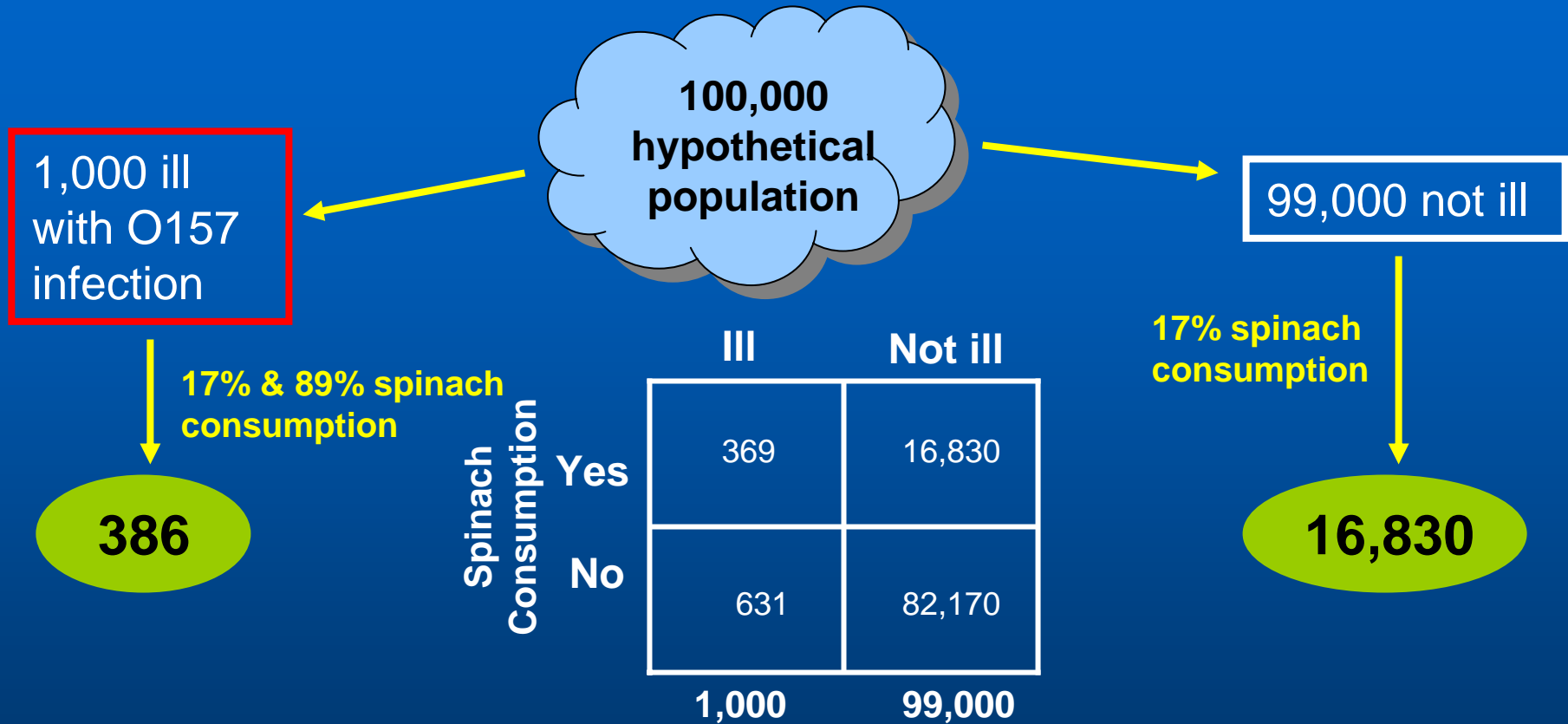


The Role of PulseNet in Outbreak Investigations

- PulseNet is a *cluster* identification tool, not an outbreak detection tool
 - PFGE cluster : 2 or more bacterial isolates with an identical DNA fingerprint
 - Foodborne outbreak: 2 or more human cases sharing a common food exposure
- Improves efficiency of epidemiologic investigation
- Strengthens accuracy of statistical analysis



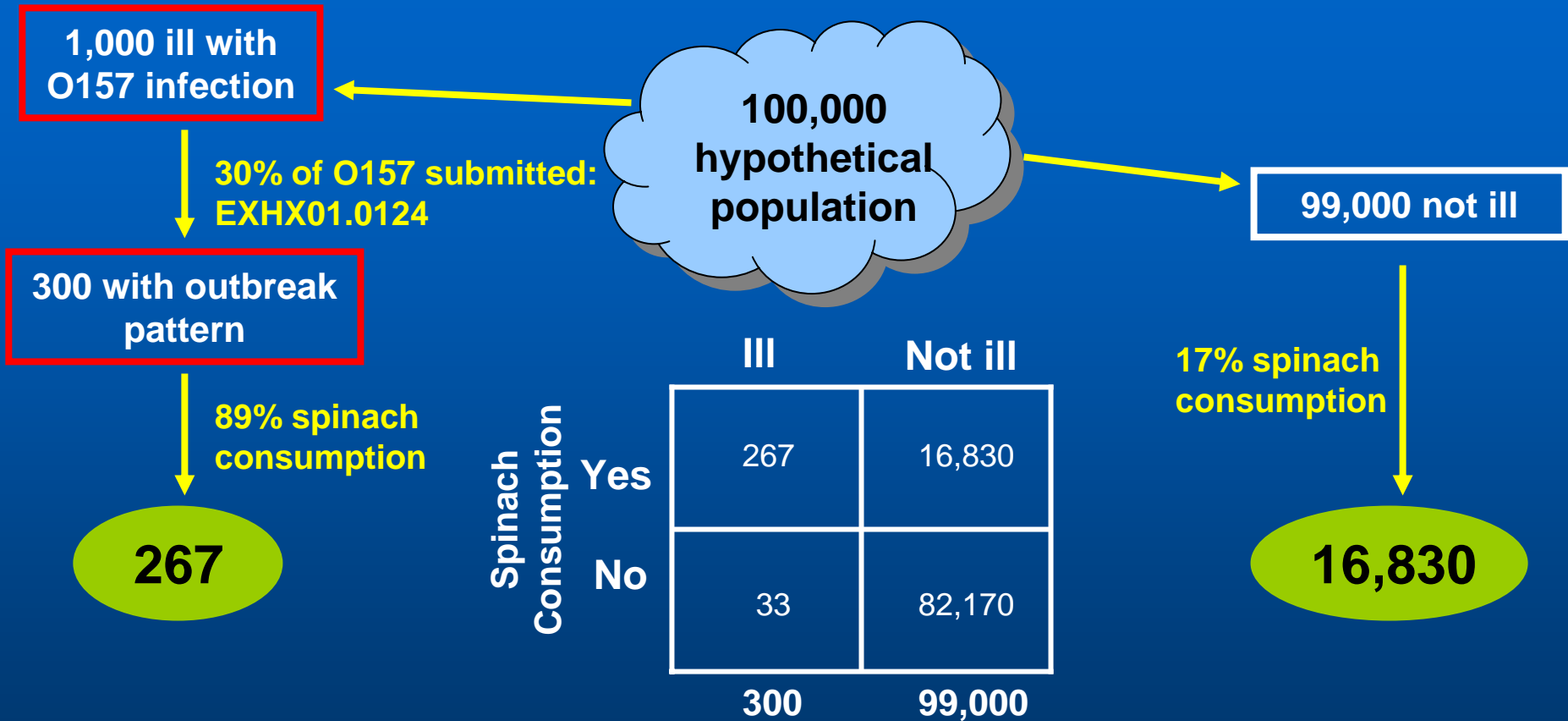
2x2 Exposure Table



$$OR = \frac{a*d}{b*c} = \frac{386*82170}{16830*631} = 2.99$$



With *specific* PFGE information...



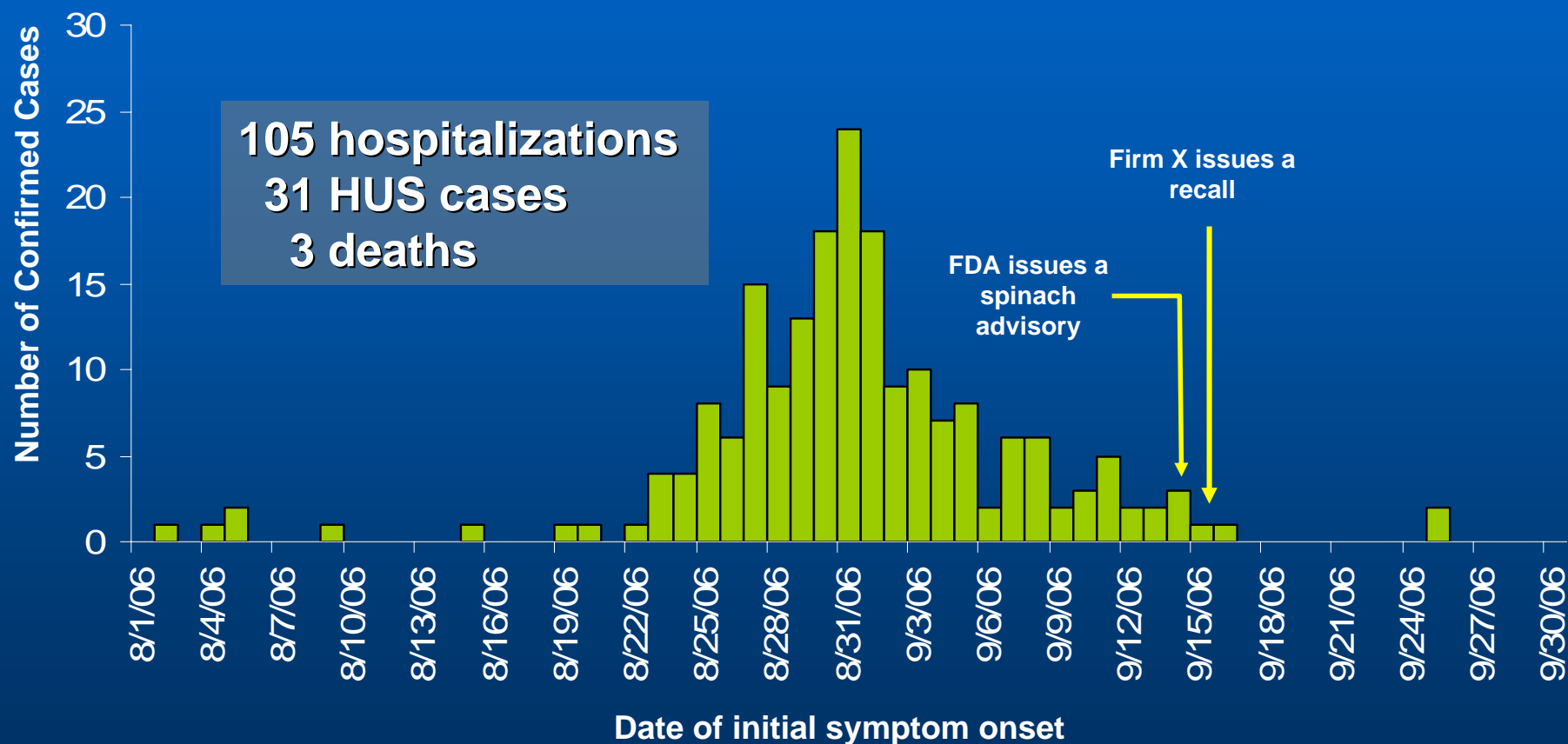
$$OR = \frac{a*d}{b*c} = \frac{267*82170}{16830*33} = 39.5$$



Epidemic Curve of Cases:

O157 Infections Associated with Consumption of Fresh Spinach

August – October, 2006



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Impact of Public Health Response: Too Little, Too Late?



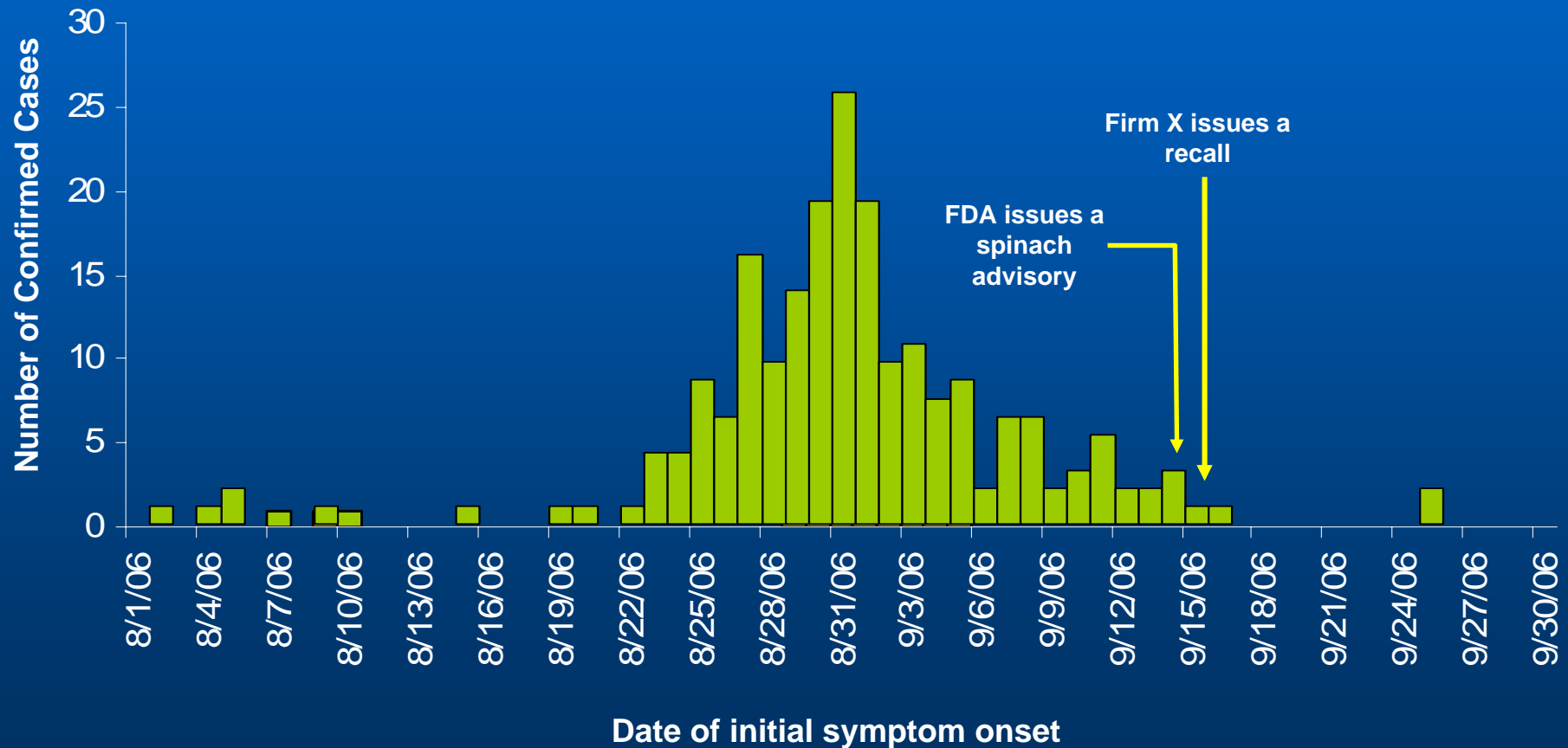
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Epidemic Curve of Cases:

O157 Infections Associated with Consumption of Fresh Spinach

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Impact of Public Health Response: Too Little, Too Late?

- Removed potentially contaminated spinach from homes
- Encouraged ill persons to seek medical care
- Media attention fueled public awareness of produce as a potential vehicle for transmission of *E. coli* O157



It's Not Magic!

- **PulseNet assists epidemiologists:**
 - Identify potential widespread outbreaks sooner
 - Increase efficiency of epidemiologic investigations
 - Strengthens accuracy of statistical analyses
- **Outbreak investigation still driven by shoe-leather epidemiology**



Thank you

The screenshot shows the CDC website's 'Outbreak Response and Surveillance Team (ORST)' page. The header includes navigation links like 'CDC Home', 'About CDC', 'Press Room', 'A-Z Index', and 'Contact Us'. The main title is 'Department of Health and Human Services, Centers for Disease Control and Prevention'. A search bar is present on the right. The page content is divided into three main sections: 'Topic Contents' on the left, 'ORST Overview' in the center, and 'Quick Links' on the right. The 'Topic Contents' section lists links for Home, Foodborne Illness A-Z, Outbreak Surveillance Data, Published Articles, and Events. The 'ORST Overview' section explains the team's role in national surveillance and investigation of foodborne outbreaks, accompanied by an image of various fruits. Below this, it describes foodborne illness causes and symptoms, and provides links for reporting a foodborne illness to the General Public, Healthcare Professionals, and Health Departments. The 'Quick Links' section offers direct access to government food safety information, reporting problems with FDA-regulated products, FSIS (USDA) food problem reporting, the FDA/USDA Foodborne Illness Education Center, FoodSafety.gov, and the Enteric Diseases Epidemiology Branch. At the bottom right, there is a 'Contact Information' link.

[CDC Home](#) | [About CDC](#) | [Press Room](#) | [A-Z Index](#) | [Contact Us](#)

CDC Department of Health and Human Services
Centers for Disease Control and Prevention

CDC en Español Search: [Go](#)

Outbreak Response and Surveillance Team (ORST)

Topic Contents

- [Home](#)
- [Foodborne Illness A-Z](#)
- [Outbreak Surveillance Data](#)
- [Published Articles](#)
- [Events](#)

ORST Overview

The role of the Foodborne Disease Outbreak Response and Surveillance Team (ORST) is to conduct national surveillance on foodborne infections and outbreaks of foodborne illness and to assist in the investigation of foodborne disease outbreaks that take place in the United States or affect its population.



Foodborne illness is caused by harmful bacteria, viruses, parasites or chemicals that are found in food and beverages and enter the body through the gastrointestinal tract. Although usual symptoms may include vomiting, nausea, abdominal cramps and diarrhea, there is not a single set of symptoms attributable to all foodborne illness. [more](#)

Reporting a Foodborne Illness

[General Public](#) [Health Departments](#)

[Healthcare Professionals](#)

[Email this page](#)
[Printer-friendly version](#)

Quick Links *

- [The Gateway for Government Food Safety Information](#)
- [How to Report Problems with Products Regulated by FDA](#)
- [FSIS \(USDA\): What to do if You Have a Problem with Food Products](#)
- [FDA/USDA Foodborne Illness Education Information Center](#)
- [FoodSafety.gov](#)
- [Enteric Diseases Epidemiology Branch](#)

[Contact Information](#)

<http://www.cdc.gov/foodborneoutbreaks>



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